

I. Project Title and Purpose Statement

Exposure to mercury through subsistence fishing: Assessment and outreach in Lower Gills Creek, SC

This project will investigate the potential for the presence of the water based toxin, mercury, in fish within Gills Creek and then effectively communicate those findings and the related health effects to the surrounding communities of Arthurtown, Washington Park, Little Camden, Starlite, Eastway Park, Sims, and Bluff Estates. The Gills Creek Watershed, located in Richland County, South Carolina, includes over 70 miles of streams and lakes and covers 76 square miles (see included map). Because of its proximity to Columbia and associated development, Gills Creek Watershed is one of the most impaired watersheds in the state. High levels of mercury have led to state issued fish consumption advisories within parts of the watershed. Limited testing in the early 1990s found mercury in some fish but no comprehensive follow-up assessment was made so the full status of mercury in fish in Lower Gills Creek is unknown. Even with fish consumption advisories upstream, nearby residents from poor, African American communities continue to fish in the Creek and its tributaries. This is especially important as many of these people are consuming the fish - frequently as a principal source of protein. This project will identify if mercury is accumulating in the fish of Gills Creek, determine consumption rates of fish caught in the creek system, and educate and train the affected community on the hazards and risks associated with consuming those fish. If, through the fish sampling, no harmful level of mercury is found, then the positive results will be relayed to the community as well and will, ideally, influence community members to continue using the fish as a portion of their diet. The project will take place in Columbia, South Carolina; zip codes 29201 and 29205. The activities of the project directly relate to the Clean Water Act. The final goal of the project is to effectively communicate the findings of the fish tissue samples, positive or cautionary, to the residents of the surrounding community that are engaging in subsistence fishing on Gills Creek. If potentially hazardous levels of mercury in fish tissue are discovered then the main goal will be to educate and train those engaged in subsistence fishing on the hazards and risks associated with that in an attempt to reduce their health risk by reducing their consumption.

II. Environmental and/or Public Health Information

The Gills Creek Watershed is one of the most impaired urban watersheds in South Carolina. Within its 70 miles of streams and lakes there are five sites listed on South Carolina Department of Health and Environmental Control's (SC DHEC) 303(d) list of impaired waters. The 303(d) list classifies three sites as unswimmable because of high fecal coliform levels. The other two sites are listed as impaired due to low dissolved oxygen and the inability to support a balanced indigenous aquatic community¹. In addition to the state 303(d) list, SC DHEC has implemented fish consumption advisories in four areas within the Gills Creek Watershed. These fish consumption advisories are all due to high levels of mercury in larger fish species within four of the lakes of the watershed (see included map). The locations of these fish advisories, however, are further up Gills Creek Watershed and outside of the proposed project area. No complete fish sampling has taken place in the lower reaches of the creek to this point so the potential need for fish consumption advisories in the proposed project area is unknown.

¹ SC DHEC 2012 303d list

Lower Gills Creek flows for 6.56 miles from its discharge out of Lake Katharine (the last lake in the watershed) before reaching the Congaree River just south of Columbia. The Congaree River is a large, slow moving river that winds its way south through bottomland hardwood forests and National Park lands until it reaches its confluence with the Wateree River and forms the Santee River system. The Congaree is home to many species of freshwater fish. Gills Creek has no major fish obstructions from its confluence with the Congaree up to the Middle Watershed. Recollections from long-time residents attest to the excellent fishing opportunities that were, and still are, possible in Gills Creek.

Because of the nature of the Watershed and existing conditions upstream, it is likely that there is indeed mercury present in fish in Lower Gills Creek which lies just south of the City of Columbia. Compounding this problem, nearby residents from the surrounding poor communities routinely fish in this portion of the creek and it is known that many of these fishers consume their catch. High levels of mercury consumption can lead to serious human health issues, especially to the nervous system. Unborn babies and children are most vulnerable to mercury poisoning. The exact amount of consumption is unknown at this point but quantifying that consumption is one of the first objectives of this project.

The communities surrounding Lower Gills Creek are well established and have a long history in the area. The Arthurtown, Sims, Little Camden, Washington Park, Bluff Estates, Starlite, and Eastway Park communities abut Lower Gills Creek on the south side of Columbia. These communities are traditionally underserved and primarily African American. In the two census tracts that constitute the project area, African Americans make up 56% of the total population². In census tract 117.01 about 14% of the households received food stamps within the last 12 months and the median household income is \$11,606. In neighboring census tract 117.02 over 15% of households received food stamps within the last 12 months and the median household income is \$38,846.

Fish can be a healthy and nutritious food source that is inexpensive or even free to obtain. The project area is devoid of grocery stores and historically underserved. The nearest grocery store is over four miles away and is not easily accessible without a personal vehicle³. The lack of access to healthy food and grocery stores as well as the economic demographics of nearby residents makes subsistence fishing an attractive alternative. These communities, since they surround Lower Gills Creek, are the primary users of the creek. Lower Gills Creek does not have any public or recreational access. These underserved communities that surround the creek constitute the vast majority of the people fishing in (and eating from) Lower Gills Creek and are therefore disproportionately impacted.

The Arthurtown, Sims, Little Camden, Washington Park, Bluff Estates, Starlite, and Eastway Park communities will benefit from this project in several ways. First and most importantly, through fish sampling, the residents will learn what, if any, health risk exists from eating fish from Gills Creek. Through our training and outreach the residents will know which fish and how much fish are safe to eat. These community residents will reduce their consumption of high risk fish, thereby reducing their exposure to mercury and the negative health effects associated with it. They will also learn about the benefits of eating fish as a source of protein. In addition, our findings will be shared with SC DHEC as well as the South Carolina Department of Natural Resources (DNR).

III. Historical Connection to the Affected Community

The Gills Creek Watershed Association (GCWA), located in the City of Columbia and Richland County, South Carolina was originally formed in the late 1990s by a group of citizens who noticed a decline in water quality in the Lake Katharine area. In 2007, with the support of Richland County, the

² Census data; Profile of General Population and Housing Characteristics: 2010

³ Arthurtown to BI-LO on Garners Ferry Rd

GCWA reformed with a major focus on comprehensive watershed management. Since 2007, the GCWA has been working to create a strong and dedicated membership base and advocate for sensible policies for watershed protection and restoration. The GCWA is a membership based organization with members from all parts of society. We are striving to grow our membership and reach new groups within our watershed. The affected communities lie mostly within the Gills Creek Watershed and as such are impacted by most GCWA activities. One major project GCWA is currently undertaking is the planning and design of a greenway through the Middle Watershed of Gills Creek. This proposed greenway would connect (via walking paths) many of the communities identified in this project to a commercial node area that includes two grocery stores; Whole Foods and Bi-Lo. Several public stakeholder meetings to discuss the project were held to help shape the plans of the greenway.

Starting in late 2014, a graduate student from the University of South Carolina, in partnership with GCWA, began work on a thesis project that directly impacts the affected community and this proposed project. The student will be completing a thorough fish survey of the Gills Creek Watershed and then create easily distributable brochures and flyers that highlight the fish of Gills Creek. Although this thesis work will not test for mercury in fish tissue, the fish species and diversity will be valuable information for the affected community and for this proposed project.

The GCWA works closely with a number of churches within in the watershed. Board member and project manager, Tameria Warren, assisted with the formation of the Green Congregations initiative which worked with local area churches. Ms. Warren is also an active congregant and leader of the Genesis Project (environmental organization) at the Bible Way Church of Atlas Road, a partner in this project. The Bible Way Church has been a pillar of these affected communities since 1963 and now has over 15,000 members. The GCWA Education Committee typically works with churches within the watershed and will help during the outreach portion of the project.

Another project partner, Columbia Urban League, has long standing ties with African American communities throughout Columbia including the communities affected by this project. Columbia Urban League is the local chapter of the Urban League, a national nonprofit organization devoted to empowering African Americans to enter the economic and societal mainstream. The Urban League movement was founded in 1910 with the Columbia Urban League chapter opening in 1966. Since that time the Columbia Urban League has been engaging members of these underserved communities through education and youth empowerment, economic empowerment, health and quality of life empowerment, civic engagement and leadership empowerment, and civil rights and racial justice empowerment.

The residents of the affected communities will be an active part of the decision making process for this project. Most importantly, we need to know where the residents typically fish in Gills Creek and how much of the catch they are consuming. We will hold meetings through our partners (the local churches and Columbia Urban League) with local residents to gather their knowledge. We will use this information to select the most effective sampling locations. Those residents will also take part in a survey to quantify their fishing and consumption rates. Upon the completion of the project, local residents will have a better understanding of their environment and their capacity to address potential environmental issues that arise. If high mercury levels are detected through the fish sampling, community residents will take an active role in the outreach, education, and training that takes place. GCWA and its partners will continue an open working relationship with the affected communities through the local churches and correspondence with GCWA. GCWA maintains a webpage and sends out monthly e-newsletters. The community will have full access to these resources. Furthermore, membership with the GCWA will be encouraged as a way to keep those community residents involved in environmental issues in their area and watershed. As mentioned earlier, other projects are planned in this area of the watershed that directly affects these environmental justice communities including a Gills Creek Greenway. The contacts made through this study will be reengaged for future projects and

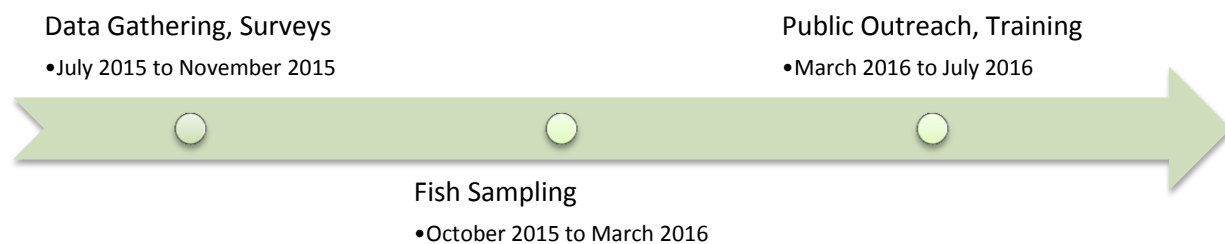
planning efforts. Wherever possible, community members will be asked to serve on one of the Gills Creek Watershed Association's committees or boards to ensure long term communication and partnership with the affected communities.

IV. Project Description

i. The Gills Creek Watershed Association and its partners seek to achieve an increased awareness by community members of the Arthurtown, Sims, Little Camden, Washington Park, Bluff Estates, Starlite, and Eastway Park communities of the potential health risk of consuming fish from Gills Creek. Based on limited historical testing it is likely there is some amount of mercury in the fish of Gills Creek. What is unknown, however, is the concentration of mercury in the fish and how much fish the nearby residents are consuming. GCWA realizes the health benefits of fish consumption and will encourage those residents to continue to do so if it is not deleterious to their health. If mercury levels are detected that warrant a reduced consumption of fish then those results will be clearly shared with the community so as not to frighten them away from fish consumption all together. A multi-format education and outreach campaign will be used to disseminate the results and implications of the mercury fish study to the affected environmental justice communities.

The project will achieve these results through strategic partnerships with the University of South Carolina Aiken, local churches, community leaders, and the Columbia Urban League. The local churches, including Bible Way Church of Atlas Road, have many members, most of which are residents of the affected communities. Bible Way Church of Atlas Road has over 15,000 members alone and is in the heart of the affected community. These churches have long standing ties with the community and will be utilized to help educate and train the affected residents.

This project has three distinct phases which are detailed below. It should be noted that Phase II can start before Phase I has completely finished. Phase III cannot begin until Phases I and II are complete.



Phase I: Data Gathering & Community Involvement

Natural resource managers and specialists in human dimensions of fisheries management have spent decades developing and perfecting surveying methodology for investigating questions and issues relating to subsistence, recreational/sport, and commercial fishing. Subsistence fishing, as opposed to recreational and commercial, encompasses fishing that is carried out primarily to feed oneself, one's family, and even one's neighbors. Subsistence fishing is commonly practiced throughout the world, including in the United States. Compared to other fisheries, subsistence fisheries in the United States are diffuse, sporadic, and less dependent on established infrastructures which can make it difficult to monitor and easy to ignore⁴. For the purposes of the current project, these points are particularly important because SC DHEC has documented relatively high concentrations of total mercury in several

⁴ Schumann and Macinko, 2007

species of fishes (i.e., bowfin, largemouth bass, and chain pickerel) within the boundaries of Gills Creek Watershed⁵.

Understanding the fishing and fish consumption patterns of local subsistence consumers and recreational anglers who also consume what they catch is an essential step in assessing potential exposure to environmental contaminants such as mercury⁶. Care must be taken though to ensure that the appropriate scientific methods are applied in investigating exposure through fish consumption because many species of commonly consumed fishes are often low in contaminants and provide a healthy alternative source of protein and other nutrients compared to more fatty meat products such as beef. Working with subsistence fishers and recreational anglers to understand what species they target and consume, their values and perceptions related to fishing, and their interests in exploring additional sources of food fish is essential in moving a subsistence community toward long-term food safety and security. Additionally, once an understanding is obtained of which fish are mainly caught and consumed, a systematic and targeted investigation can be conducted in which these species are sampled across a range of sizes/ages to better understand patterns of contaminant concentrations and potential risks to consumers⁷.

For the current study we will work with local community leaders, churches, and tackle shops to identify a core group of subsistence fishers to participate in in-person interviews designed to obtain information concerning fishing patterns, consumption rates and amounts, fishing values, and fisher perceptions. We will work with community leaders including church groups and our core group of subsistence and recreational fishers to identify up to 300 survey participants. All subsistence and recreational fisher surveys will be conducted in person, by Dr. Shervette or other personnel she has trained. Project partners the Columbia Urban League and Bible Way Church of Atlas road will help to identify active fishers from these communities as well as community leaders.

The information that survey participants provide will remain confidential and all information connecting an individual to survey answers will be kept in a locked file cabinet in the key-access-only office of Dr. Shervette on the campus of USCA. Additionally, digital information that potentially connects a participant to their answers will be saved on a password-protected computer and external hard drive in Dr. Shervette's office. Dr. Shervette has and is currently conducting studies concerning human dimensions of fisheries management including two in other parts of South Carolina similar to this one. All information gathered concerning fishing patterns in Gills Creek Watershed will be used in writing a formal report to present to the community and later transformed into a manuscript to submit for publication. A growing recognition of the value in understanding the diversity among the population of fishers and their preferences and experiences is essential to effective management of resources⁸. Understanding what is important to various fishing groups is useful in predicting how groups will impact fishery resources⁹. The report will provide the community and managers with information concerning the demographics, philosophies, traditions, values, and understandings of people who use the fishery resources of Gills Creek Watershed and main species and sites targeted by the community.

Various components of the study will be analyzed statistically. Statistical questions for this research include (but are not limited to): Do significant differences exist across cultural backgrounds (race/ethnic)/ age groups/ gender in fishing experience/ trip satisfaction/ economic expenditure/ importance of fishing as it pertains to reasons for fishing? ANOVA and chi-square statistical tests will be utilized for survey responses.

⁵ Glover et al., 2010

⁶ Burger, 2002

⁷ Burger, 2002; Burger et al, 2001

⁸ Hunt and Ditton, 2002

⁹ Hunt et al., 1991

Phase II: Field Sampling, Processing, and Analysis

Fish sampling will focus on locations and species identified through the interviews with the affected community. We will target three species for quantifying mercury concentrations. Sampling and processing will be consistent with methods used by the SC DHEC Fish Tissue Monitoring Program¹⁰ to allow for comparisons with published state-wide data. We will utilize a combination of hook-and-line and electrofishing to obtain the samples. Fishes will be collected across a range of sizes and in multiple months for each species to assess spatial and temporal variability in contaminant levels. Once a fish is caught it will be placed in an individual plastic bag with a label indicating date and site of collection then stored on ice in a cooler. At the end of each daily sampling period, all fish will be transported to the Fish/Fisheries Conservation Lab at USCA in Aiken, SC and transferred to freezers. Water physicochemical parameters (temperature, dissolved oxygen, conductivity, turbidity, pH) and geographic coordinates will be recorded at each sampling location.

Each fish will be identified to species, weighed (0.1 g) and measured for total length (TL) and standard length (SL) to the nearest millimeter. Similar to Glover et al. (2010), sterile techniques in handling and obtaining muscle tissue will be employed. Additionally, sagittae otoliths (ear bones) will be removed for age determination and gender of each specimen will be noted. Muscle tissue will be stored in separate labeled containers and refrozen until analyzed for total mercury.

Fish tissue analysis of mercury will be performed by Dr. Shervette and students she has trained using a Milestone Direct Mercury Analyzer (DMA-80; EPA 7473) at the Savannah River Ecology Lab (SREL). The DMA-80 is calibrated with two five-point curves (low, high) using matrix matched standard reference materials. One sample per batch (approximately every nine samples) is analyzed in duplicate to assess precision. Control samples include blanks, empty nickel boats, and standard certified reference materials (TORT and DOLT from the National Research Council of Canada).

Species-specific mercury concentrations will be compared with EPA, FDA, and SC DHEC threshold levels used in issuing consumption advisories. For each species we will use regression analysis to evaluate relationships between size/age of fish and total mercury concentrations for area as a whole and also for each sampling site. Utilizing a combination of the survey data concerning consumption rates (factoring in frequency and portion size) and mercury data of each species caught from the area, we will develop models for calculating participant average species-specific mercury dose per fish meal¹¹. All of this information will be summarized and utilized in developing community outreach tools.

Phase III: Dissemination of Results and Community Education

Upon completion of the fish sampling the Gills Creek Watershed Association, in conjunction with Columbia Urban League, local churches, and community leaders, will begin the third phase of the project. This phase involves community outreach, public education, and training to relay whatever information is discovered from Phase II and the implications of those findings on community members.

GCWA and its partners will hold another series of meetings, similar to what was done in Phase I, with community members identified as fishers as well as any other interested parties. Presentations will be given by GCWA education and outreach staff in easy to understand language that will clearly explain the results of the fish sample and what that means for human health. Recommendations will be given as to the level of fish consumption and materials will be provided for dissemination throughout the community. These materials include, but are not limited to, brochures and information packets that contain the results of the sampling, what can and should be done regarding the results, and where to find more information. The materials will clearly state which types of fish and how much fish are safe to eat. GCWA staff, project manager Tameria Warren, and Dr. Shervette will help facilitate these public

¹⁰ Glover et al., 2010

¹¹ modified from Lincoln et al., 2011

meetings and answer questions from the general public. We will also work with the Media Arts department at either Benedict College (an HBCU) or USC on a short public awareness video about the project and its results and what those implications are for the health of the affected communities. The video will be shown at the meetings, placed on the GCWA website, and made available for others to use in presentations and web sites.

The community members will take part in an active comanagement process in which their input will impact the project. The dissemination of the results will take on a more educational form as we provide information to the communities about the risks associated with mercury and the mercury levels of the fish. An important issue we plan to discuss is the consumption advisories. In many cases people turn away from fish consumption entirely if there is a consumption limit in place. It will be important to differentiate between a fish consumption limit and no fish consumption at all. Identified community leaders will be instrumental in helping us reach those community members that are not already reached by the churches or through our other outreach efforts.

GCWA hopes to grow its membership base through contacts made during this project. Because we are a member based organization, it is up to the membership base, through the board of directors, to decide what issues we pursue. Membership with the GCWA will be another way for the affected community to increase their capacity to address local environmental and public health issues. Affected community leaders identified in this project will be encouraged to join one of the GCWA's committees or boards to ensure a long lasting relationship between the GCWA and the affected environmental justice communities. Further, these communities will be engaged by GCWA in other identified watershed projects that are planned for these areas.

This proposed project directly relates to the Clean Water Act. This project will conduct and promote an assessment and survey into the effects and extent of mercury contamination in Gills Creek. It will also conduct research and provide public education and training on mercury in fish tissue and its potential health effects on nearby residents.

ii. Our primary partners for this project include Columbia Urban League, the University of South Carolina Aiken (Dr. Shervette), and the Bible Way Church of Atlas Road. We plan to work closely with many of the churches in the affected communities, especially Bible Way Church of Atlas Road (the largest and most visited). Each of the partners will play a vital role in reaching the community members and educating them as to the results of the fish sampling.

Columbia Urban League has extensive networks with African American communities throughout Columbia. Columbia Urban League is a chapter of the National Urban League. The National Urban League is a historic civil rights organization dedicated to economic empowerment in order to elevate the standard of living in historically underserved urban communities. Founded in 1910 and headquartered in New York City, the National Urban League spearheads the efforts of its local affiliates through the development of programs, public policy research, and advocacy¹². Their network continues into the affected community and will be used to help identify community leaders and other community members that may be influential or otherwise useful in this project. Columbia Urban League, in many instances, has personal relationships with the community and community members and will use those relationships to help identify people that are fishing in Gills Creek. Any educational materials GCWA produces will also be distributed by Columbia Urban League using their pre-established network.

The churches, including Bible Way Church, will provide another connection to people that may be fishing in Gills Creek. The churches provide a large captive audience which will help to disseminate the results of the fish sampling. The churches will also provide a place to meet with local residents and fishers.

¹² *About Us*; www.columbiaurbanleague.org

Dr. Virginia Shervette, at the University of South Carolina Aiken, has past and current experience working on projects similar to this one. This partnership will have a leadership role in the community surveys, fish sampling, and laboratory analysis.

The GCWA will maintain and sustain these partnerships through constant contact with them. Before, during, and after project implementation GCWA staff will be corresponding with church representatives, Columbia Urban League staff, and community leaders to coordinate efforts and relay information as it becomes available. The Columbia Urban League office is less than two miles from the GCWA office and the affected community and its churches are less than five miles from the GCWA office. Project manager Tamera Warren is a congregant at Bible Way Church, a Guild Member of the Columbia Urban League, and a Board Member of GCWA. Her ongoing participation with these partners ensures a long standing relationship between GCWA, Columbia Urban League, and Bible Way Church (as well as other community churches). Also, there are more watershed projects planned in this area including a Gills Creek Greenway that will require continued partnership with these organizations and communities.

V. Organizational Capacity and Programmatic Capability

The Gills Creek Watershed Association has received and successfully managed many grants ranging from local level grants up to federally funded grants. In 2013 GCWA was awarded a 319 nonpoint source pollution reduction grant from SC DHEC. These are federal funds from the EPA that are administered through SC DHEC (overseen by Delaney Faircloth at SCDEHC, Contract #EQ-4-545). Approximately \$184,000 of 319 grant funds is being used to construct three large bioretention cells to capture and treat polluted stormwater at Owens Field Park in Columbia, SC; only a couple of miles from the environmental justice communities targeted in this proposal. Public education and outreach is another major objective of the 319 project and will include public meetings, workshops, and environmental educational signage. This 319 grant project is still underway and GCWA is in full compliance with all federal and state grant requirements, including monthly reporting and match requirements.

In 2012 GCWA received an \$18,000 grant from Richland County Conservation Commission for the completion of a stream restoration and recreation master plan. The Middle Watershed Master Plan was completed in 2013 and details opportunities for stream restoration, stormwater best management practices, recreational opportunities, and a greenway through the middle and lower portions of Gills Creek Watershed, including parts of the environmental justice communities identified in this proposal. All reporting requirements, public meetings, and deliverables were completed by the GCWA Program Coordinator. GCWA received another grant from the Richland County Conservation Commission in 2014 for \$13,000 to develop environmental educational signage at key locations throughout the watershed. This project is currently underway and, again, the GCWA Program Coordinator is responsible for meeting all grant deadlines, reporting requirements, and deliverables.

All grant funded projects are managed through the combined efforts of full time GCWA staff, GCWA board members, and organizational members. It is the GCWA Program Coordinator's and project manager's duty to see these projects through and to comply with the guidelines put forth by the funder.

The GCWA is well equipped to handle federal funds. There are nineteen board members and a Financial Stewardship Committee made up of private industry executives and university faculty (with federal grant experience). These personnel will assist with project implementation and the management of grant funds. Furthermore, GCWA staff and Treasurer use QuickBooks accounting software and all financial processes are overseen by the organization's Treasurer. GCWA conducts an annual external audit by a local CPA firm using generally accepted accounting principles. The 2014 audit was recently completed for which the GCWA received a positive review. Both the GCWA staff and board

members have the organizational experience necessary to achieve the goals, and have done so, on projects similar in scope to this one.

VI. Qualifications of the Project Manager

Tamera Warren has a vested interest in the proposed project. Her home and place of employment is within close proximity to the areas in which sampling and analysis would occur, meaning the water quality of the lower watershed directly impacts her quality of life. Additionally, Ms. Warren is the leader of the Genesis Project (environmental group) at Bible Way Church of Atlas Road which is located in the project area and a partner in this project. The church was founded in 1963 in the small community of Arthurtown and through expansion, outreach efforts, and an audience of over 15,000 people at its new location, it continues to impact the surrounding area including the communities of Little Camden, Washington Park, Richard Street, Bluff Estates, Starlite, and Eastway Park, the city of Hopkins, and the other portions of Lower Richland County.

Since its inception in 2008, the Genesis Project has been committed to educating the congregation and local community about their roles in being good stewards of the environment. Their initiatives have included the creation of an environmental resource guide, a community farmers market, “green” cooking workshops, gardening and compost workshops with the Richland County Master Gardeners Association, green vendor displays, community clean-sweep projects, quarterly Adopt-a-Highway projects with Keep the Midlands Beautiful, environmental curriculum for Vacation Bible School, and annual e-recycling events with Richland County Solid Waste and Recycling. They have actively kept the congregation and community informed about environmental impacts. Ms. Warren’s involvement with the proposed project will be another opportunity for the Genesis Project and Bible Way Church of Atlas Road to continue their education of local citizens.

Ms. Warren also serves as a board member and Education Committee chairperson for the Gills Creek Watershed Association, board member for Sustainable Midlands (as well as a member of its Midlands Green Congregations Initiative), and current Sustainability Management System (SMS) coordinator for United States Army Garrison Fort Jackson. All positions require Ms. Warren to engage in awareness training, educational presentations, and/or outreach opportunities with the local community. She has participated in numerous events that have allowed her to share information about watershed management and sustainability with both youth and professionals. Events include, but are not limited to, neighborhood association meetings, local Science, Technology, Engineering, and Mathematics (S.T.E.M.) youth expos, environmental symposiums, and community festivals and programs. Besides providing guidance and resources for the proposed project, Ms. Warren will be actively engaged in assisting with the educational component.

Ms. Warren has been involved in bringing environmental awareness not only to citizens in the City of Columbia and Richland County, but those underrepresented populations that reside in her immediate community.

VII. Past Performance in Reporting on Outputs and Outcomes

The GCWA is in the thirteenth month of a thirty month long 319 nonpoint source pollution reduction grant that was awarded by SC DHEC (overseen by Delaney Faircloth at SCDEHC, Contract #EQ-4-545, “Owens Field Park BMP Construction and Education”). GCWA is in full compliance with this grant and has submitted monthly reports and invoices as stipulated in the 319 grant contract. To this date, GCWA has never defaulted on or failed to meet the requirements of a grant contract.

The GCWA documents and reports its progress towards achieving the expected outputs and outcomes of a project in a number of ways. Usually the funder stipulates a format of how they would like to receive the results. In these situations the project manager drafts and files the appropriate report along with all supporting data. The GCWA also publishes an annual report in which all major projects and milestones are detailed. Furthermore, the GCWA publishes a monthly e-newsletter in which it gives updates as to the expected outcomes and progress of the project. All materials produced for this project, including the video, handouts, and comprehensive report, will be available for submittal to the EPA.

For the current 319 EPA/DHEC grant, GCWA will be reporting outputs by the area (square feet) of bioretention cell constructed. Outcomes will be reported using the amount of stormwater being intercepted by the cells (gallons), and by the estimated amount of pollutants reduced (pounds per year). These outputs and outcomes have already been calculated and reported but are being constantly reviewed and revised as project construction continues.

Whenever possible, the GCWA includes public education and outreach as a portion of a grant project. The number of attendees at workshops, public meetings, or input sessions is reported as outcomes of a particular project. On a current environmental education signage grant from Richland County Conservation Commission, a QR Code is being added to the signs so that viewers may follow the Code using a smart phone to access additional information. The number of people following the QR Code can and will be tracked by GCWA staff and webmaster and reported as a project outcome. The number of educational signs and number of meetings held are reported as outputs.

VIII. Quality Assurance Project Plan Information

This project will involve the collection of new environmental data. Dr. Shervette with USCA has much experience in fish sampling and aquatic toxicology. She will provide a Quality Assurance Project Plan prior to project implementation. See the attached QAPP questionnaire.

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